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NATIONAL INCOME : THIRD QUARTER OF 1950

(All tables contain figures in £ millions at annual rates. For notes see earlier issues of the BULLETIN, especially May 1950).

TABLE I

National Income at Current Factor Cost, Seasonally Corrected

	1948	1949	1949	1950		
			IV	I	II	III
Agriculture	550	590	600	600	600	600
Industry	5380	5850	6120	6280	6440	6540
Services	2890	3130	3160	3160	3250	3320
Total Business	8820	9570	9880	10040	10290	10460
Government	1060	1130	1125	1120	1115	1130
Other	420	425	455	460	465	475
Gross National Income	10300	11125	11460	11620	11870	12065
Less Depreciation	—900	—975	—990	—1000	—1010	—1020
Net National Income	9400	10150	10470	10620	10860	11045

TABLE II

National Income at Average 1949 Factor Cost, Seasonally corrected

	1948	1949	1949	1950		
			IV	I	II	III
Agriculture	580	590	590	580	580	580
Industry	5470	5850	6040	6140	6290	6400
Services	3040	3130	3100	3100	3160	3220
Total Business	9090	9570	9730	9820	10030	10200
Government	1105	1130	1120	1115	1105	1105
Other	420	425	455	460	465	475
Gross National Income	10615	11125	11305	11395	11600	11780
Less Depreciation	—935	—975	—990	—1000	—1010	—1020
Net National Income	9680	10150	10315	10395	10590	10760

THE AGGREGATE

There has been one change in procedure here. The figures for agriculture have been revised, because the Ministry of Agriculture has very kindly made available to us the official estimates of the value of agricultural output in recent crop-years. We are most grateful for this help, particularly as our previous estimates were inevitably very uncertain owing to lack of evidence. No estimate is available for the value of output in the crop-year 1950–51, in which the third quarter of 1950 falls, and we have therefore taken the 1949–50 figure for the third quarter.[1]

It will be noted that in 1950 the output of manufacturing at current factor cost moves parallel to that at fixed factor cost, implying stability of factor cost per unit of output. The movement of the ' unit factor cost ' index used to obtain the value of manufacturing output has been interesting, or perhaps one should say that its lack of movement has been interesting, though *too much* should not be expected from a study of it in view of the inevitably rough way in which we put the index together.

The construction of an index for inflating the volume movements shown by the Interim Index of Industrial Production into a series which will reflect changes in the value added by the manufacturing sector at current factor cost has always presented acute problems. The expedients which we have adopted to overcome them have been described in previous papers.[2] In principle, we need an index which will reflect changes in the ratio :

$$\frac{\text{Value added in the Manufacturing Sector.}}{\text{Volume of output in the manufacturing Sector.}}$$

No published series is, in itself, satisfactory as an indicator of the change in this ratio, but a combination of several series may give us a rough guide. Basically, our approach is to compare the output prices of the manufacturing sector with input prices. But even at this level the data available are inadequate. Our index of ' output ' prices is based on series from the Wholesale Price Index, the Export Price Index, and earnings data : and each of these series is unsatisfactory for our purposes. The Wholesale Price Index has a very high ' input ' price content, the Export Price Index is subject to influences (particularly influences affecting profit margins) peculiar to foreign trade, and earnings data are belated and do not reflect profits or productivity. And for ' input ' prices we rely exclusively on Import Prices, which may move in a manner very different from the prices of non-imported inputs (such as the purchases of the manufacturing from the home agriculture and service sectors).

But when all the various qualifications are made, we can learn a little by studying the final index of ' unit factor cost '. During 1949, the index rose because ' output ' prices rose relative to ' input ' prices. During 1950 however, ' input ' prices rose more rapidly than ' output ' prices, and the index shows a remarkable stability,[3] suggesting a stability of unit factor cost. Since the wage bill rises in smaller proportion than the value of output, implying a fall in unit labour cost, it also suggests a rising gross profit margin.

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[1] The new estimates for the first three quarters of 1949 are £590m., £590m. and £600m. respectively at current prices; and £610m., £580m., and £590m., at 1949 prices.

[2] See BULLETINS for October 1949 and May 1950.

[3] *I.e.* the rise in ' output ' prices could just be explained by the ' input ' price rise, the latter having a relatively low (negative) weight in the final index.

The National Income continues to rise at a rapid rate, of about £800 million per annum, of which some three-quarters seems to be due to volume as opposed to price, increases. As before, this rise is mainly due to Industry, though the service sector also increased its output rather sharply in the summer.[1]

The continuous and complete series of employment statistics since December 1948 allows us now to make a much more comprehensive analysis of productivity than previously. We can analyse the influences of employment volume[2] and output per man as follows :

Industrial Sector Indices for 1950
(Corresponding quarter of 1949=100)

	Output	*Employment*	*' Productivity '*
First Quarter	108.8	101.7	107.0
Second Quarter	107.7	101.6	106.1
Third Quarter	108.9	102.0	106.8

Virtually the same story is shown for each quarter : Output is running throughout 8–9 per cent above 1949, employment is about 2 per cent higher, and output per man over 6 per cent higher. The stability of the implied estimate of overall 'productivity' for the sector provides good confirmation of the rise in ' productivity '[3] and suggests that it is being sustained beyond the expectations of all commentators, official or unofficial, including ourselves. Overall ' productivity ' in 1949 was 5.2 per cent above that of 1948, so that the increase in ' productivity ' has definitely accelerated this year. Since each 1 per cent rise in ' productivity ' in the industrial sector increases national income by over £60 millions, the fast growth of ' productivity ' in this sector is clearly the main force carrying the national income up at the present rapid rate. We can further analyse the output in the industrial sector by groups as follows :—

Indices for Groups of Industries for 1950
(Corresponding quarter of 1949=100)

		Output	*Employment*	*'Productivity'*
Mining...	First Quarter	101	97½	103½
	Second Quarter	102½	97½	105
	Third Quarter	101½	97½	104
Manufacturing ...	First Quarter	110	102	107½
	Second Quarter	109	102	107
	Third Quarter	110½	103	107½
Building	First Quarter	105½	100	105½
	Second Quarter	105½	100½	105
	Third Quarter	106	100	106
Utilities	First Quarter	104	106	98½
	Second Quarter	106	106	100
	Third Quarter	106½	105½	101

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[1] Due mainly to higher receipts from railway goods traffic and higher retail turnover.

[2] Including self-employed proprietors. In all these calculations the average employment for the period is the weighted average of the employment at the end of the preceding period (weight 1), the end of the period concerned (weight 1) and the end of each month in the period (weights 2 each).

[3] Except of course that the use of limited information may introduce spurious stability.

The steadiness of the ‘ productivity ’ estimates here too is encouraging evidence of their reliability. The main rise is still occurring in the manufacturing sector, though there is good support from mining and building. The increased ‘ productivity ’ in mining was more than enough to offset the fall in the labour force for the three quarters, and in building it alone provided the means of increasing output. In utilities, the rise in output has recently become greater than the rise in employment, contrary to experience in previous periods.

The above calculations use ‘ manpower ’ as a denominator, including self-employed, whereas the calculations by industry below use ‘ employees ’ only, from statistical necessity. For the total of the manufacturing sector we can compare the two methods, since both ‘ manpower ’ and ‘ employee ’ totals are available. We have then two estimates for ‘ productivity ’ :

(Corresponding period of 1949=100)

	Jan.–April	*May–July*
Per person occupied	107.5	107.4
Per employee	107.4	107.4

It makes very little difference, in fact, because of the small number of self-employed.

In manufacturing there was some recruitment supplementing the increases in ‘productivity,’ particularly for the third quarter. We cannot show the development by quarters for each industry, because of erratic fluctuations in several series. What we can do here is to show the figures for four-monthly periods (see Table on next page).

As before, the rise in productivity is still occurring mainly in a narrow group of industries, though there are still good performances shown by engineering, textiles, and ‘ other manufacturing ’ (mainly rubber products), and substantial improvements shown by non-ferrous metals and chemicals. On the whole the latter period does not suggest quite such a strong reliance on vehicles, precision instruments and paper and printing as the earlier period does.[1]

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[1] One might add that the amount of detail published in the index seems to be designed primarily with an eye on what can be shown in a double page of the Digest of Statistics. It would be most interesting to have a little more detail, particularly separate indices for shipbuilding, passenger cars, cotton, wool, boots and shoes, rubber products and house-building. We know from the official account that such indices are prepared.

Indices for Manufacturing Industries in 1950
(Corresponding period of 1949=100)

Standard Industrial Classification		*Jan.–April*			*May–August*		
Order	*Industry*	*Output*	*Employment*	*'Productivity'*	*Output*	*Employment*	*'Productivity'*
III	Building Materials and Pottery[1]	104	102	102	106	102	104
	21 China and Earthenware	102	101	101	100	101	99
	22 Glass	98	104	95	112	103	108
	20, 23, 24, Bricks, Cement, etc.	106	102	104	106	103	103
IV	Chemicals	107	103	104	117	103	114
V	Metal Manufacture[1] ...	104	100	104	108	101	107
	40–44 Ferrous	105	100	104	105	101	104
	49 Non-ferrous	104	100	104	115	102	112
VI	Engineering and Shipbuilding	107	99	108	108	100	108
VII	Vehicles	119	102	117	114	102	112
VIII	Other Metal Goods[3] ...	105	101	104	(106)	(101)	(105)
IX	Precision instruments, Jewellery,[2] etc.	137	103	132	(128)	(103)	(124)
V-IX	*Total Heavy Industries Group*	*110*	*100*	*110*	*110*	*101*	*109*
X	Textiles	111	104	106	111	104	106
XI	Leather Goods[2]	109	105	104	(107)	(105)	(102)
XII	Clothing	108	106	102	97	103	95
X and XII	*Total Textile Group*	*110*	*105*	*105*	*105*	*103*	*102*
XIII	Food, Drink and Tobacco	106	103	103	103	102	101
	150–157, 162 Food ...	109	104	105	107	102	104
	163–169 Drink and tobacco	100	101	99	98	100	98
XIV	Wooden goods[3]	109	105	104	(99)	(103)	(97)
XV	Paper and Printing ...	124	105	118	120	105	115
XVI	Other Manufacturing[3] ...	116	102	114	(118)	(104)	(113)
	Total Manufacturing ...	109.8	102.3	107.4	109.5	102.0	107.4

[1] Constructed by applying the index weights for sub-groups to the sub-group indices.
[2] 1950 figures refer to May—June only for the second period.
[3] 1950 figures refer to May—July only for the second period.

DISTRIBUTIVE SHARES

TABLE III

National Income by Distributive Shares, Seasonally Corrected

	1948	1949	1949	1950		
			IV	I	II	III
Wages	4050	4280	4360	4415	4445	4470
Salaries	2140	2250	2270	2280	2290	2305
Forces' Pay	245	245	235	230	220	230
Rent	465	470	475	475	480	480
Profits and Interest	(2500)	(2905)	(3130)	(3220)	(3425)	(3560)
Net National Income	9400	10150	10470	10620	10860	11045

Our estimate of wages in this quarter shows a slight increase over the previous quarter, in spite of the stability of the wage-rate index over this period. This is due partly to the fact that employment was somewhat higher, and partly to the allowance which we make for increases in earnings not associated with wage-rate changes. The latest earnings data[1] covering earnings in April, 1950, show that up to that time earnings continued to rise rather faster than wage-rates. In part at least this is a reflection of higher piece-rate earnings consequent upon productivity increases—the Ministry of Labour Gazette for March 1950 suggested that 29 per cent of the workers covered by their earnings enquiry were employed under some sort of contract involving payment by results.

The estimate of Forces' pay shows an increase this quarter. Employment in the Forces ceased to decline, and an allowance has been made for the effect of the increased rates of pay for the Armed Forces which were introduced on Sept. 1st. The profits residual is still rising at a steady and fast rate. Allowing as we do in these estimates for the inadequacy of depreciation allowances in 1948, and ignoring inventory gains, total pre-tax profits and interest including proprietors' profits have increased by about £1,000 millions in the past two years.

BALANCE OF PAYMENTS

The estimates for 1949 and the first half of 1950 have been completely revised in the light of information given in the latest White Paper on the balance of payments (Cmd. 8065). Previous White Papers have given the value of payments made for imports, and payments received for exports: now (to quote from Cmd. 8065) ' the Current Account is based on estimates of transactions, involving changes of ownership, as in national income statistics '. Our method of constructing quarterly estimates is unaffected by this change. The White Paper figures for exports and imports still differ from those published by the Board of Trade, not only because imports are valued f.o.b., but also because change of ownership does not always coincide with shipment. Even in the case of exports, therefore, it is still necessary to apply some correction factor to the Board of Trade figures in order to take account of the lag between shipment and change of ownership.[2] Indeed, since this lag seems to vary in a less predictable manner than the lag between shipment and payment, the task of the estimator is actually rendered more difficult by the change.

The results, however, are of course far more satisfactory. In our previous estimates, any increase or decrease in the value of goods shipped was partly offset by a corresponding change in the correction factors. As a guide to the current situation, therefore, our figures were rather misleading, since the series was unnaturally (though unavoidably) smoothed. Now that we are no longer concerned with payments, there is no necessary connection between changes in the value of shipments (as recorded by the Board of Trade) and changes in the correction factors which we apply to these.

In estimating exports and imports for the third quarter, correction factors of 12.5 per cent (for imports) and 1.5 per cent (for exports) have been used.

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[1] M.O.L.G. September 1950.

[2] There are also other differences, of a curious nature, which would in any case make some adjustment necessary. The Board of Trade statistics take no account of diamonds, silver, and second-hand ships, and treat the Channel Islands as a foreign country.

TABLE IV

Foreign Trade at Current Prices, NOT *Seasonally Corrected*

	1948	1949	I	II	III	IV	I	II	III
				1949				1950	
Visible Imports	1790	1965	1840	1990	1965	2065	2170	2430	2220
Invisible Imports	475	540	510	515	605	535	515	500	590
Total Payments... ...	2265	2505	2350	2505	2570	2600	2685	2930	2810
Visible Exports	1585	1820	1885	1775	1700	1910	2100	2070	2235
Invisible Exports	600	650	620	640	665	675	785	870	915
Total Receipts	2185	2470	2505	2415	2365	2585	2885	2940	3150
Surplus (+) or Deficit (—) ...	—80	—40*	+155	—90	—205	—15	+200	+10	+340

* Does not equal difference between payments and receipts because of rounding.

TABLE V

Foreign Trade at Current Prices, Seasonally Corrected

	1948	1949	I	II	III	IV	I	II	III
				1949				1950	
Visible Imports	1790	1965	1915	1910	1930	2110	2260	2320	2190
Invisible Imports	475	540	525	530	555	555	530	520	535
Total Payments ...	2265	2505	2440	2440	2485	2665	2790	2840	2725
Visible Exports	1585	1820	1865	1790	1735	1875	2080	2090	2280
Invisible Exports	600	650	620	645	660	680	785	870	910
Total Receipts	2185	2470	2485	2435	2395	2555	2865	2960	3190
Surplus (+) or Deficit (—) ...	—80	—40*	+45	— 5	—90	—110	+75	+120	+465

* Does not equal difference between payments and receipts because of rounding.

It appears that during the quarter the United Kingdom had a large favourable balance on current account, particularly when allowance is made for seasonal variation. Our figures also indicate that even after seasonal correction the balance of trade was positive—certainly for the first time in the twentieth century, and probably for the first time in seventy-five years.[1] However, these conclusions must be accepted with some reserve, since the correction factor which has been used for imports may prove to have been unduly high, and the apparent fall in imports in the third quarter is largely the result of a higher correction factor.[2] It is doubtful whether the favourable visible balance, even after seasonal correction, falls outside the margin of error in the estimates. But there can be no doubt that there was in this quarter a striking improvement in the international position of the United Kingdom, and that we were roughly in visible balance.

Further, the Board of Trade returns for October and November suggest that the balance of trade continues to be favourable. Unless the balance on invisible account has been appreciably worsened as a result of the Korean war, it seems likely that the current account surplus for the year 1950 was in the region of £250 million.

CONSUMPTION

TABLE VI. *Final Consumption at current prices, seasonally corrected*

	1948	1949	1949	1950		
			IV	I	II	III
Food	2220	2380	2515	2635	2610	2500
Drink	760	720	725	685	715	750
Tobacco	775	765	745	730	775	825
Rent and Rates	600	615	615	620	630	630
Fuel and Light	340	350	355	365	370	355
Household goods	520	580	610	635	605	615
Clothing	855	950	990	950	945	1045
Other	2045	2050	2045	2085	2120	2090
Total	8110*	8405*	8600	8705	8770	8810

* Detail does not add to total because of rounding.

TABLE VII *Final Consumption at average 1949 prices, seasonally corrected*

	1948	1949	1949	1950		
			IV	I	II	III
Food	2280	2380	2400	2415	2430	2450
Drink	755	720	730	735	740	750
Tobacco	785	765	765	765	765	765
Rent and Rates	600	615	615	620	620	625
Fuel and Light	345	350	355	360	365	370
Household Goods	525	580	590	605	610	620
Clothing	895	950	965	975	975	1000
Other	2075	2050	2055	2060	2060	2065
Total	8260	8405*	8475	8535	8565	8645

* Detail does not add to total because of rounding.

[1] It will be seen that the visible balance was probably favourable in the first quarter of 1949, but that if we allow for seasonal influences it is likely to have been unfavourable.

[2] The value of shipments (seasonally corrected) falls only slightly in the third quarter.

In our construction of seasonally corrected consumption estimates, we are essentially abstracting from the experience of a particular quarter in an attempt to show the sort of trend which is operating when specifically seasonal influences have been eliminated. The seasonal influences affecting value data may be of two types : seasonal quantity movements and seasonal price movements. These two seasonals are evidently not independent. On general grounds, we should suspect that seasonal price changes would be in a reverse direction to seasonal quantity changes : that prices would tend to be high when supplies are limited, and that prices would tend to be low when supplies are abundant.

When we correct value data for seasonal influences, in principle we eliminate the effect of both price and quantity seasonals by applying correction factors which reflect the combined effect of the two types of seasonal. On this approach, our series for ' consumption at current prices, seasonally corrected ' would reflect the operation of price and quantity trends. Now these two latter trends may show a divergent movement, and for certain purposes it is interesting to separate them out. One way of doing this is to eliminate the price trend from the seasonally corrected value data to obtain a series which reflects the quantity trend : and this is what our series of seasonally corrected fixed-price estimates of consumption attempts to do. Alternatively, if we are given a fixed-price series from which all price changes, whether seasonal or trend, have been eliminated, we can obtain the quantity trend by correcting the fixed-price series for seasonal quantity movements.

Thus when both a value and a fixed-price series are available, and if we can ignore (or correct for) ' random ' fluctuations (*i.e.* those which represent neither trend nor seasonal movements) our calculations can proceed in two stages :

1. We can correct the value series by a factor which combines the effect of both price and quantity seasonals.

2. We can correct the fixed-price series by a factor reflecting the quantity seasonal.

Prior to the last set of estimates, our procedure was as follows. We calculated seasonal correction factors from series of fixed-price consumption data obtained by deflating consumption value data over a period of years by price-indices derived from the Interim Index of Retail Prices. The consumer goods and services covered by this Index are likely to be less sensitive to seasonal fluctuations of price than are the goods and services which fall within the White Paper definition of consumer expenditure, and it is therefore possible that our fixed-price series and the derived seasonal correction factors reflected to some extent the operation of both price and quantity seasonals. We used these factors to correct current value data to obtain our series of ' consumption at current prices, seasonally corrected '. We then deflated these series by price-indices from the Interim Index of Retail Prices to obtain our estimates of seasonally corrected consumption at fixed prices, which were of course accurate only in so far as the index is a suitable deflator for consumption aggregates.

Since the summer of 1950, official fixed-price estimates of consumption have been published, which will provide a more accurate basis for our seasonally corrected fixed price estimates than could be obtained by our previous roundabout methods. In particular, it will enable us to abandon the Interim Index of Retail Prices, which is in many respects unsuitable as a deflator for consumption aggregates. However, before this official series can be satisfactorily incorporated, we need to calculate seasonal correction factors which will reflect the operation of quantity movement alone. This cannot be done at present, because the official fixed price series are only given from the first quarter of 1949 onwards.

For the present set of estimates, we retain our original method of calculating the series of ' consumption at current prices, seasonally corrected '. As indicated above, the seasonal correction factors which we use reflect part of the price seasonal as well as the quantity seasonal, and therefore their use here is not entirely inappropriate as a means of correcting a value series. We obtain our seasonally corrected fixed price series by roughly smoothing the official fixed-price data, in the hope that by so doing we shall secure an approximation to the quantity trend. These are temporary expedients : when full information for 1950 is available we shall calculate two sets of seasonal correction factors. The first will be based directly on value data to show the combined effect of price and quantity seasonals, and will be used in the construction of our series of ' consumption at current prices, seasonally corrected '. The second will be based directly on fixed price data to reflect the operation of the quantity seasonal, and will be used in the construction of our series of ' consumption at fixed prices, seasonally corrected '.

The use of two different methods of removing seasonal influences means that comparison between current-price and fixed-price estimates must be made very cautiously. We can for example attribute the fall in the value of food purchases to the seasonal price fall, which was particularly marked this year. But we cannot attribute the fall in drink expenditure at the beginning of the year to a price fall, even though there is no corresponding fall in the fixed-price series. The reason is that the seasonal changes in drink expenditure, particularly on spirits, have become more marked as the supply position has improved, and are not adequately reflected in the correction factors for Table VI. The upward trend in quantity of alcoholic drinks is however fairly firm (if we allow for the strengthening of beer) and the quantity is now near 1948 levels once more. Slight upward trends in quantity are in fact evident for all commodity groups, though the evident marked rise in clothing expenditure was apparently partly due to price rises. The total at current prices rises smoothly, though rather slowly.

TABLE VIII

Provisional Estimates of National Income and Expenditure for 1950

	1949	1950		1949	1950		1949	1950
Agriculture	590	600	Wages	4280	4460	Consumption	8405	8800
Industry	5850	6480	Salaries	2250	2300	Govt. Current Spending	2035	2250
Services	3130	3280	Forces Pay	245	235	Net Investment	1385	(1425)
			Rent	470	480			
Total Business	9570	10360	Profits and Interest	(2905)	(3475)	Export Deficit(—)	—40	
Government	1130	1130				or Surplus (+)		+250
Other	425	475						
Gross National Income	11125	11965				Net National Product	11785	12725
Less Depreciation	—975	—1015				*Less* net Indirect Taxes	—1635	—1775
Net National Income	10150	10950	Net National Income	10150	10950	Net National Income	10150	10950

Provisional Estimates for the Year 1950

We have attempted to estimate the main components for the calendar year 1950, based on the estimates for the fourth quarter, and it seemed worthwhile to attempt some early provisional estimates in preparation for the big economic debates of Easter. (See Table VIII)

One change we have introduced in the official estimates for 1949 is that we have taken the revised balance of payments deficit from the latest Balance of Payments White Paper, with a corresponding adjustment to the estimate for internal capital investment. Since there is a major definitional change in the latest official estimate (see above), which in effect reclassifies some investment as ' external ' instead of ' internal ', it seemed advisable to assume that no change was implied in the aggregate national income, but that the revisions were wholly attributable to this reclassification.

Our first estimate is that the National Income has been about £800 million higher in 1950 than in 1949—much the same as the increase between 1948 and 1949 (if we correct for inventory gains and the abrupt change in legal depreciation allowances). The difference is that this year the rise has been almost wholly a ' real ' one, whereas the 1948–9 increase was more influenced by price rises. Over half this rise appears to have gone to profits, and, since inventory gains must now be rising once more, company profits results published in the future should show a substantial improvement. On the expenditure side, nearly half the increase went into increasing personal consumption. The remainder was divided between achieving a substantial export surplus and supporting a rise in Government current outlay, capital investment at home (including stockbuilding) apparently being about unchanged.

Analysis of National Expenditure

The detailed quarterly estimates of outlay suggest that the increase in national output, substantial though it was, has not been enough (quite) to carry the enormous improvement in the foreign balance, which was achieved despite a sharp deterioration of the terms of trade, *plus* the rises in consumption and Government spending. This is shown in our estimates by the sharp fall in the investment residual that accompanies each big rise in the export surplus—*vide* the first and third quarter experience shown in Table X. Since fixed capital investment has not changed much, this suggests a fall in stocks, which is quite comprehensible, because a sudden rise in exports or fall in imports would be met in the first instance out of stocks.

The year 1949 saw substantial stockbuilding throughout the economy : 1950's economic successes have been to some extent achieved by reversing this process, following the reversal of the previous downward trend in the pressure of demand on the nation's resources. Wholesale and retail stocks of textiles do indeed show a fall in the third quarter, but the destocking must be occurring mainly at an earlier stage along the industrial pipeline, and will presumably mean shortages on the shelves of shops in 1951.

TABLE IX

National Expenditure at Current Prices NOT *Seasonally Corrected*

	1948	1949	1949 IV	1950 I	II	III
Consumption	8110	8405	8990	8220	8735	8990
Govt. current spending	1770	2035	2120	2170	2210	2260
Net Investment	1215	1385	(1220)	(1605)	(1730)	(1075)
Export deficit (—)	—80	—40	—15			
or surplus (+)				+200	+10	+340
Net National Product	11015	11785	12315	12195	12685	12665
Less Net Indirect Taxes	—1615	—1635	—1745	—1565	—1755	—1890
Net National Income	9400	10150	10570	10630	10930	10775

TABLE X. *National Expenditure at Current Prices, Seasonally corrected*

	1948	1949	1949 IV	1950 I	II	III
Consumption	8110	8405	8600	8705	8770	8810
Govt. current spending	1770	2035	2120	2170	2210	2260
Net Investment	1215	1385	(1525)	(1305)	(1520)	(1340)
Export deficit (—)...	—80	—40	—110			
or surplus (+)				+75	+120	+465
Net National Product	11015	11785	12135	12255	12620	12875
Less net Indirect Taxes ...	—1615	—1635	—1665	—1635	—1760	—1830
Net National Income	9400	10150	10470	10620	10860	11045

TABLE XI. *National Expenditure at Average 1949 Prices, Seasonally Corrected*

	1948	1949	1949 IV	1950 I	II	III
Consumption	8260	8405	8475	8535	8565	8645
Govt. current spending	1840	2035	2100	2135	2155	2190
Net Investment	(1270)	1385	(1420)	(1275)	(1210)	(1050)
Export deficit (—)	—60	—40	—30			
or surplus (+)				+110	+325	+550
Net National Product	11310	11785	11965	12055	12255	12435
Less Net Indirect Taxes ...	—1630	—1635	—1650	—1660	—1665	—1675
Net National Income	9680	10150	10315	10395	10590	10760

DUDLEY SEERS.

In association with P. D. HENDERSON and D. G. HOLLAND.

APPENDIX: PERSONAL INCOME AND SAVING

We can now make some tentative quarterly estimates of personal income and saving. Total personal income was reached in four steps. First, income from work was taken from Table III. Secondly, distributed property income was assumed to be slightly rising : it has been £1,462m., £1,463m. and £1,465m. in the three years before 1950, but there may have been a slight acceleration recently with some relaxation of dividend limitation.[1] Thirdly, transfer incomes were extrapolated, with the help of the Economic Survey forecasts. Fourthly there are mixed incomes : professional earnings were assumed constant, farming income was taken to change *pari passu* with output of the agricultural sector, and an estimating function was sought for sole traders' profits.

The basic assumption was that these profits (P) are a linear function of the value of turnover (T) of businesses controlled by sole traders, thus:

$$P = bT - a.$$

Since most sole traders' business is conducted on a gross profit margin which is a constant proportion of turnover, we would expect their *gross* profits to vary directly with turnover. *Net* profits would be related to turnover in the manner indicated by the above function, provided salary, rent and other costs are constant in the short run, as indeed may be reasonably assumed.[2] (They are of course then equal to a).

This function can only be reached very indirectly. Sole traders control businesses in retailing, wholesaling, catering, entertainments, transport, building, finance, manufacturing, etc.,[3] and while we have data for the turnover of some of these activities, we have no separate information for the businesses which are unincorporated. By far the most important activity for sole traders is however the sale of consumer goods and services. Those who are not directly engaged in this are mostly in ancillary activities such as the transport or advertising of these goods, and even those in manufacturing are mainly engaged in the final stage of processing consumer goods (especially clothing). Consequently let us take value of turnover in the consumers' market as an indicator of T. But we need to limit the consumers' market slightly. Fuel and light are hardly handled by sole traders,[4] nor is rent; and to include the value of drink and tobacco turnover would be to expose these calculations to fluctuations in the overall profit margin for all commodities, because the private traders' margins on these commodities are so small.[5] Consequently let us use C', the value of consumption expenditure excluding these commodities, and assume : $T = cC'$

Then $P = bcC' - a$ i.e. $\Delta P = bc\Delta C'$

We can obtain two points for estimating the parametric product ' bc '. Unfortunately the sole traders' profits shown in the National Income White Paper include inventory gains, which we exclude by definition from our quarterly estimates, and which are only distantly a function of T. The White Paper shows in fact only £10 million increase from 1948 to 1949 in sole traders' profits. If we eliminate the effect of inventory gains (and also the change in the legal definition of depreciation)[1] we obtain the following relation for 1948–9 : $125 = 321bc$

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[1] And a slight jump at end-1949 because of the increase in the sterling value of dividends from some oversea countries after devaluation.

[2] Though of course this relation may break down if the composition of the turnover varies with respect to profit margins.

[3] For a full analysis of the self-employed see BULLETIN, Vol. 12, p. 298.

[4] Except for some private handling of coal (for which quarterly consumption estimates are not available).

[5] This may of course lead to some downward bias in the estimating coefficient (see below).

$\therefore \Delta P = 0.4\ \Delta C'$ is our estimating equation.

We cannot use data for earlier years because of the lack of information on inventory gains. This relation must therefore be considered a very tentative one, and yields only very rough estimates of sole traders' profits. However we have good quarterly estimates of C', and the estimate of personal income depends mainly on the estimates of other components, particularly the wage-bill (built on the firmer foundation of data on wages, earnings and employment).

The next estimate required is that of direct taxes on personal income. One would like to make this separately for each type of income, but we are rather defeated here by the difficulty of allocating the effect of the change in tax rates between each type of income. However, since the tax rates did not change violently in 1948 or 1949, we can work separately with tax payments on employees' income and on the remainder. It appears from Table 33 in *Cmd.* 7933 that income tax and sur-tax on wages, salaries and forces' pay rose by £28 millions between 1948 and 1949. But the 1948 Budget introduced major tax concessions which of themselves reduced employees' tax payments by about £21 million between 1948 and 1949 (because the first quarter of 1948 was taxed at the old rates), while the 1949 Budget, by its different treatment of National Insurance, was responsible for a rise of about £7 millions between the two calendar years. Thus changes in the rates would in themselves have reduced the taxes on employee incomes by about £14 million on balance. Since the total effect of changes in rates and in the incomes themselves was to raise the taxes by £28 millions, the increased incomes must have been responsible for a rise of £42 millions in taxes (at 1948–9 financial year rates). The change in employee income was £339 millions between 1948 and 1949, and the marginal incidence of taxation on employee income in 1948–9 was thus .125, which would also have applied in the financial year 1949–50.[2] The 1949–50 budget cut marginal income tax on lower incomes by one-sixth and in view of the lack of change in marginal rates on higher incomes, the marginal incidence overall will be taken to have been reduced to .11. Proceeding similarly for taxes on other personal income, we find that the change in tax *liabilities* due to changes in income was about £25 millions or .35 of the change in income (assumed to have declined to .33 after the 1950 Budget)[3]. There was little point in attempting to use 1947 information as well, partly because of difficulties in analysing the

[1] See Appendix A to 'The levelling of incomes' (BULLETIN, Vol. 12, No. 10).

[2] This may seem rather low, but much of the increase in wages is tax-free since about one-third of the number of employees appear to pay no income tax ; and the effective standard rate on earned income is only .36 (allowing for the earned income allowance), a rate paid by a minority of salary-earners and very few wage-earners. Needless to say, this co-efficient depends on what section of employees is getting increases in income, and it may therefore be rather unstable.

[3] These calculations were made (perforce) without excluding inventory gains, but they can be taken as applicable to income arising from trading activities only, because the marginal rate of tax is the same however the income arises.

influences on the total tax bill, and partly because it was only early in 1948, with the virtual end of demobilisation and the greater emphasis on income stabilisation, that an economic situation capable of yielding results relevant to 1949 and 1950 emerged. Using these coefficients, the quarterly changes in tax liabilities due to changes in incomes could be estimated and the addition of estimates of the effect of changes in the tax rates provided the quarterly estimates of taxation required.

These calculations yielded the following estimates.[1]

(Seasonally corrected annual rates, at £m.)

	1948	1949				1950		
		I	II	III	IV	I	II	III
Personal Income ...	9615	9910	10115	10185	10350	10480	10510	10590
Less Tax Liabilities* ...	1135	1280	1330	1350	1390	1425	1345	1365
Disposable Income ...	8480	8630	8785	8835	8960	9055	9165	9225
Less Consumption ...	8108	8170	8410	8445	8600	8705	8770	8810
Personal Savings*... ...	372	460	375	390	360	350	395	415

* Since tax liabilities exclude taxes on capital, the savings residual is implicitly gross of provision for such taxes.

To interpret this table is very difficult since we do not know whether to attribute the changes in savings to changes in the propensity to save or to changes in the availability of consumer goods.[2] On the whole our view is that the economy was still suffering from excess demand sufficient for us to put the main emphasis on the latter. Certainly the high savings early in 1949 appear to have been due to the success of the export drive, which was drawing off the increased output (but not of course the increased income generated by that output). Thenceforward savings varied little for a year, and turned upward again in mid-1950. This may have been in part due to a change in the propensity to save, as the resources of some dis-savers became depleted, and as deficiencies of durables were made good. But a big share of responsibility must also be placed on the renewed successes of the export drive, which stopped consumption expenditure from rising much, while the reduction in income tax released more purchasing power.[3] There is therefore some reason to believe that the situation became slightly more inflationary in the spring of 1950, after a year of little change in this respect.

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[1] Inventory gains and taxes thereon are as far as possible excluded throughout.

[2] For a discussion of the theoretical basis for using the saving-income relation as a measure of inflationary pressure see BULLETIN for Jan.-Feb. 1950.

[3] Consumption did not rise as much as might have been expected after the other feature of the budget, higher petrol prices, came into force (even though petrol was derationed). Doubtless some of the increased expenditure on petrol was offset by consumer economies elsewhere, while the higher prices paid by business probably did not affect total costs sufficiently to be passed on, at least until product prices were changed on other grounds. So the Budget was to a mild extent inflationary, at least in its initial impact, despite the apparent balance between the value of concessions and the additions to taxation.

A 'HUMAN NEEDS' DIET IN NOVEMBER 1950

Our regular bi-annual survey in November of the cost of a 'human needs' diet for a family with three children of school age, was undertaken in the second half of November 1950. As on previous occasions, prices were collected for comparison in London, Oxford, and Reading. This time however, we visited, in addition, three smaller towns in the same regions—Slough in conjunction with London, Banbury with Oxford, and Newbury with Reading. We discovered no striking differences in either the supply or the prices of the foods included in our diet schedule, which contains only such foods as could be bought without difficulty in any of these towns, at the prices shown.[1] We naturally assumed that the ingredients for a 'human needs' diet are always purchased in the less expensive shops of a district.

Since our last survey in April 1950, several changes had occurred in the rationing of food, the most important being the abolition of 'points' rationing. Most of the foods that had been rationed in this way were freely available in November. On the other hand, the butter ration—replaced in our dietary by margarine—had been cut by 1 oz. per head per week, as well as the bacon ration. There was, further, no special sugar allocation for the ration period beginning November 4th; this reduced the amount of sugar available in November to 8 ozs. per head per week.

In April 1950, most fresh vegetables were scarce and very dear, but there was no shortage of them in November. Hence it was possible to allow in our dietary for November substantially larger quantities than had been possible in April, since in most families with small or moderate means the amount of fresh vegetables consumed is affected by their cost. Even with an income that permits a nutrition well above the 'human needs' level, housewives will tend to restrict their purchases of vegetables if they consider them too dear and buy something else instead, perhaps, even, some luxury foods from which their families derive a greater gastronomical satisfaction than from the common vegetables. On account of the increase in the quantities of vegetables, our dietary for November would supply substantially larger amounts of vitamin A and vitaman C[2] than the dietary for April, in spite of the fact that this latter, but not the former, assumed the purchase of 2 lb. of oranges per week.

Thus, alterations in the rations and, to some extent, changes in the availability of foods, called for modifications in the previous diet schedule. But what are the criteria that determine our choice of substitutes, and what, indeed, are the criteria by means of which we decide on substitution at all? For even in the case of changes in rationing the need for substitution is not obvious, unless it is assumed that the full rations should generally be included

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[1] It was sometimes difficult to obtain cuts of meat that were inexpensive and yet acceptable from the housewife's point of view. In general the quality of meat in November, including that of the dearer cuts—tended to be rather poor. Indeed, a cheap stew often made a more palatable dish than a more expensive but tough roast joint.

[2] Some of this increase would, however, be due to the fact that old potatoes in November have a much higher content of vitamin C than old potatoes in April.

TABLE I

Weekly 'Human Needs' Diet for a Family of 5 Persons

	Quantity	Price per Unit[1]		Changes since April 1950 Quantity	Cost	
		s.	d.		*s.*	*d.*
(*a*) Rationed Foods :						
1 Meat	5 ℔	1	6[2]	...		...
2 Bacon	15 oz.	2	2	— 5 oz.	—	*2¾*
3 Margarine	2 ℔ 8 oz.		10	— 5 oz.	—	*3¼*
4 Cooking Fat	10 oz.	1	0	...		...
5 Sugar	2 ℔ 8 oz.		5	—1 ℔ 4 oz.	—	*6¼*
6 Tea	8 oz.	3	8	...	+	*1*
7 Cheese	10 oz.	1	2	...		...
8 Eggs	5 eggs		3½	...	+	*2½*
Cost of Group (*a*)		*17*	*6½*		—	*8¾*
(*b*) Fresh Milk :						
9*a* Milk, ordinary... ...	18½ pt.		5	...		...
9*b* Milk, school	5 pt.	free		...		...
Cost of Group (*b*)		*7*	*8½*			...
(*c*) Main Carbohydrate Foods						
10 Bread	20 ℔		5½	+1 ℔ 12 oz.	+	*5½*
11 Flour	2 ℔		4	...		...
12 Potatoes	21 ℔		1½	...	—	3
Cost of Group (*c*)		*8*	*6½*		+	*2½*
(*d*) Fresh Vegetables :						
12*a* Carrots	3 ℔ 8 oz.		2½	+3 ℔ 8 oz.	+	*8¾*
13*b* Swedes	3 ℔ 8 oz.		2½	...	—	*5¼*
13*c* Cabbage	6 ℔ 8 oz.		4½	+6 ℔ 8 oz.	+ *2*	*5¼*
13*d* Onions	8 oz.		5	...	—	*2*
13*e* Other	...		...	—4 ℔[5]	— *2*	*4*
Cost of Group (*d*)		*4*	*1½*		+	*3*
(*e*) Other Foods :						
14 Pulses	1 ℔ 8 oz.		9½[3]	...	—	*0½*
15 Rolled Oats	2 ℔ 8 oz.		7	...		...
16 Macaroni	4 oz.		9	...	—	*0¼*
17 Semolina	1 ℔ 8 oz.		6	+1 ℔ 8 oz.	+	*9*
18 Jam	6 oz.	1	2	...		...
19 Rice	8 oz.		10	—1 ℔	—	*8½*
20 Cocoa	4 oz.	1	4½	...	+	*0½*
21 Condiments	...	1	0	...		...
22*a* Herrings	1 ℔		8	+1 ℔	+	*8*
22*b* Kippers	2 ℔ 8 oz.	1	0	...		...
23 Beef Sausages ...	1 ℔ 12 oz.	1	4½	— 12 oz.	—	*3½*
24 Oranges	...		...	— 2 ℔	— *1*	*4*
25 Dried Fruit	1 ℔		10[4]	— 8 oz.	+	*5*
Cost of Group (*e*)		*12*	*6¼*		—	*6¼*
Total Cost		**50**	**5½**		—	**9½**

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[1] The price unit is : eggs, one egg ; milk, one pint ; bread, loaf of 1¾ ℔ ; cocoa, ¼ ℔ packet ; condiments, total outlay ; all other foods, 1 ℔.

[2] Average price of inexpensive cuts. [3] Average price : peas, 10d. ; beans and lentils 9d. a ℔. [4] Stoned dates. [5] 1¼ ℔ spinach, 2¾ ℔ beetroot.

in the diet. This we have, in fact, assumed, since the rations have come to be widely considered as indispensable allowances which any housewife ought to buy. Thus even when in practice it would have been possible to replace a rationed food in part or wholly by a nutritionally equivalent but cheaper unrationed food, we have with a few exceptions refrained from doing so in our diet schedule. Butter, however, has always been omitted and replaced by margarine, while of tea we allowed only ½ lb. for a family with three children aged between 5 and 12 years, although the full ration for such a family was at least 10 oz. In both these respects we followed Mr. Rowntree's diet schedule for 1936, which formed the starting point for our investigations. When the number of ' points ' was rather high and the foods rationed in this way were largely of a semi-luxury type, not all the ' points ' were required for purchasing the foods in our schedules. This assumption did not run counter to experience; for while many housewives seem to buy the foods that are rationed specifically without much questioning, the purchase of foods rationed on ' points ' inevitably introduced the element of choice. But for a housewife with only very limited means this need for selection often made all the difference, since it tended to bring rationed and unrationed foods within the same orbit. Thus it no longer appeared unreasonable to forego a rather expensive rationed food in favour of a cheaper unrationed one, which could take its place.

During and immediately after the war, price control and the severely restricted supply of foods on the one hand, and, on the other, the conservatism of dietary habits—modified, to some extent, by the insistent advertising campaign of the Ministry of Food—made it relatively easy to draw up at any given date a schedule of a ' human needs ' diet indicating the approximately lowest cost at which a housewife would actually be able to feed her family adequately. Now, however, ' availability ' has frequently to be interpreted as a relative term, and evaluated by means of changing price differentials within a range of more or less closely related substitutes. Such changes in relative cost are certainly a consideration for an economical housewife. In this sense, ' availability ' is still a determining factor in deciding which foods, and how much of them, to include in our diet schedule.

The rationed foods of which the supply was lower in November than it had been in April, are essentially sources of energy, and it has therefore been necessary to replace them by calorific foods, such as bread, cereals, and dried fruit. Our dietary for November thus assumes the purchase of an additional 28 oz. of bread, 8 oz. of semolina, and 8 oz. of dried fruit. Herrings were scarce in April, but there was a good supply of them in November, and we included 1 lb. of herrings in the dietary for this month in lieu of 12 oz. of beef sausages.

It will be noticed that although the prices of several of the foods in our schedule had risen since April 1950, the cost of our ' human needs ' diet in November was actually 9½d. less than that of an equivalent diet in April. This was essentially due to the replacement of oranges by vegetables. The average price of bacon had risen from April to November by 4d. a lb., while its price in our schedule has been raised by only 2d. Since, however, it was generally possible in November to purchase rashers at this price, we considered ourselves justified in adopting the lower price.

Competition between shops was fairly active, often expressing itself in small differences in the prices of identical foods offered in shops that were in the closest proximity to one another. By making a careful study of these differences it was, indeed, possible to purchase nearly all the foods enumerated in Table I at prices below those shown by us, and a very careful housewife could have reduced the total cost of the dietary by at least a few pence. It is, however, too much to expect the average busy housewife to keep a close watch on small fluctuations of prices and, for their sake, to change her custom from shop to shop, and we believe that, on the whole, the prices as shown by us give a total outlay than can be taken to represent the minimum cost of the complete diet for an efficient housewife.

No allowance is made in the dietary in Table I for the purchase of the sweets ration. This, too, is now usually considered as representing an irreducible minimum, for a family with children, and many mothers would probably rather curtail their expenditure on vegetables than deprive their children of the sweets. In November, the weekly ration for 5 persons amounted to 25 oz. In the form of 8 oz. of chocolate and 17 oz. of boiled sweets, the former at 3s. 8d. and the latter at 2s. a lb., its costs would have amounted to 3s. 11½d., and it would have provided nearly 3000 calories. To counter-balance the calorific intake from these sources the family might have reduced their consumption of bread by 2 lb. 6 oz., which would have left a net increase in the cost of the diet, of 3s. 3¼d. If the consumption of bread had been cut by only 1 lb. 6 oz., while 8 oz. of rice and 8 oz. of dried fruit had also been omitted from the diet, the net increase in cost resulting from the purchase of the sweets ration would have amounted to 2s. 9¼d. However, within the confines of a ' human needs ' expenditure, sweets can probably only in part be classed as ' food ', while in part they are perhaps best considered as a form of ' human needs ' amusement. This is certainly their aspect from the point of view of most children.

The nutritional requirements of the family and the intake available from the diet are set out in Table II. The figures of requirements are given for each individual member, and are then shown as totals, taking in each instance the requirements of a male adult as 1. Thus, the calorific requirements of the family of 5 persons are those of 3.73 male adults, while their calcium requirements are those of 7.13 male adults—children of school age needing fewer calories than grown up people, but more calcium. The figures of nutritional intake available are given in the present paper only per ' man ' per day, and are not, as usually, shown separately for each individual member of the family. This seemed sufficient, since the November dietary is very similar to that for April, for which the more detailed analysis was made.[1]

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[1] *Cf* Bulletin, Vol. 12, No. 5, *A ' Human Needs ' Diet in Spring* 1950, Tables III, IV, VI, and VII.

TABLE II

Nutritional Requirements and Intake from 'Human Needs' Diet

Nutritional Requirements per Day:	Husband	Wife	Child 7—12 Years[1]	Child 5 Years	M.A.E.[2] of Family of 5 Persons	Intake from Diet p. M.A.E. per Day
Calories	3000	2500	2100	1500	3.73	3050
Protein, gm.	70	60	65	50	4.43	85
Calcium, gm.	0.8	0.8	1.4	1.3	7.13	0.6
Iron, mgm.	10	10	13	8	5.40	13
Vitamin A, Intern. Units...	3000	3000	3000	3000	5.00	3900
Vitamin B_1, mgm. ...	0.90	0.75	0.95	0.68	4.68	1.6
Vitamin C, mgm. ...	30	30	30	30	5.00	50

[1] Two children in this age group. [2] Male Adult Equivalent.

In computing the figures of nutritional intake we have again used the data of nutritive values in the *War Memorandum No.* 14, published by the Medical Research Council as a White Paper. The carotene value of the foods in the diet has been divided by 3 before adding it to the figures of vitamin A, and the vitamin C values of all the vegetables have been halved in order to allow for the loss of this unstable vitamin in the cooking and the dishing up of the foods. It will be seen that even with these cautious reductions the content of the diet of essential vitamins appears to be thoroughly satisfactory.

In Table III are given the relative shares in cost and in nutritive values of individual foods, or food groups, in the diet for November. The foods that supply the animal protein of the diet come first and are shown as a separate section, the remaining foods either containing only vegetable protein or no protein at all. In terms of calories the animal protein foods are dear, requiring 50 per cent of the total cost but only yielding about a quarter of the total energy value of the diet, while the other foods provide the remaining three-quarters, for a little over 44 per cent of the total outlay. Tea and condiments, which have no appreciable nutritive values, took up approximately 4½ per cent of the total cost.

The percentage figures of nutritive values in Table III should, of course, be considered in conjunction with the figures of actual quantities in Table I, on which they are based; yet even without them the pre-eminent importance of certain foods as sources of specific nutrients stands out clearly. Thus, over half of the calcium in the diet would be obtained from milk; nearly 62 per cent of the vitamin A would derive from carrots; over 88 per cent of the vitamin C would come from cabbage, swedes, and potatoes. Bread and flour clearly proclaim themselves as the cheapest all-round foods, providing, as they do, for less than 12 per cent of the total cost just under a third of the total calories and the total protein, and well over a third of both the iron and the vitamin B_1 in the diet. Moreover, next to milk and cheese, they are by far the best sources of calcium, which in modern diets is usually scarcer than is desirable for optimum nutrition.

In general, our November survey of the cost of a 'human needs' diet showed that it was possible to purchase a satisfactory diet for 5 persons for a

TABLE III

Relative Cost and Nutritive Values of Foods in 'Human Needs' Diet for 5 Persons (Table I)

Foods[1] (Quantities shown in Table I)	Cost	Calories	Protein	Calcium	Iron	Vitamin A	Vitamin B_1	Vitamin C
1 Meat, rationed ...	14.9	6.6	12.7	0.8	14.1	0.8	4.0	—
23 Beef sausages ...	4.8	2.1	3.5	0.8	3.3	0.1	2.3	—
2 Bacon	4.5	2.4	1.2	0.1	0.9	—	3.2	—
22 Herrings and kippers	6.3	2.3	6.5	3.4	3.3	1.2	0.2	—
8 Eggs	2.9	0.5	1.2	0.5	1.3	1.8	0.7	—
7 Cheese	1.4	1.5	2.7	7.4	0.4	2.7	0.2	—
9 Milk[2]	15.3	10.0	16.0	51.6	2.7	10.3	11.7	7.8
	50.1	25.4	43.8	64.6	26.0	16.9	22.3	7.8
3 Margarine	4.1	10.9	—	0.1	0.8	16.6	—	—
4 Cooking Fat ...	1.2	3.2	—	—	—	—	—	—
5 Sugar	2.1	5.4	—	—	—	—	—	—
18 Jam	0.9	0.5	—	0.1	—	—	—	—
25 Dried Fruit	1.7	1.3	0.4	1.0	1.6	0.1	—	—
10 Bread	10.4	28.4	28.9	16.5	31.3	—	32.6	—
11 Flour	1.3	4.0	4.0	2.3	4.4	—	5.2	—
16 & 17 Macaroni and Semolina	1.9	3.3	3.2	0.5	1.7	—	1.4	—
19 Rice	0.8	1.0	0.5	—	0.1	—	0.4	—
15 Rolled Oats ...	2.9	5.5	5.1	2.1	9.4	—	9.8	—
14 Pulses	2.3	2.4	6.0	2.0	8.5	0.1	5.9	—
12 Potatoes	5.2	6.7	5.1	2.2	6.6	—	16.8	37.2
13*a* Carrots	1.4	0.4	0.4	2.0	1.1	61.8	1.5	3.1
13*b* Swedes	1.4	0.3	0.4	1.8	1.1	—	0.7	10.9
13*c* Cabbage	4.9	0.6	1.2	4.4	4.1	4.5	3.0	40.3
13*d* Onions	0.4	0.1	0.1	0.2	0.1	—	0.1	0.7
20 Cocoa...	1.4	0.6	0.9	0.2	3.2	—	0.3	—
	44.3	74.6	56.2	35.4	74.0	83.1	77.7	92.2
Total	100.0[3]	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[1] The serial numbers correspond to those in Table I.

[2] Including 5 pints of milk received free by 3 children at school.

[3] Including cost of tea (3.6 per cent) and of condiments (1.0 per cent).

little over 50s. per week, *i.e.*, at a cost slightly below that of an equivalent diet in April, in spite of a rise in the prices of some foods. Vegetables, however, were much cheaper in November, and there was also an ample supply of kippers and herrings ar fairly low prices. On the whole shopping presented few difficulties, since all the shops appeared to be well stocked with most of the foods required for a 'human needs' diet.

T. SCHULZ.

VARIATIONS IN UNEMPLOYMENT RATES

I

The object of this study is, firstly, to compare the differences in unemployment percentages between regions with those between industries; secondly, to consider the problem how far the level of unemployment in a region is determined by the industrial structure of the region. To some extent, the paper follows up suggestions made by H. W. Singer (now of Lake Success, N.Y.) and E. M. Hugh-Jones (of Oxford), to both of whom I am greatly indebted.

The data on which the analysis is based are the number of employed and unemployed persons classified by industry in 11 regions of Great Britain at July 1948 and, for purpose of comparison, at July 1939. They are given in the ' Tables relating to employment and unemployment in Great Britain ', published by the Ministry of Labour and National Service. For 1948, the figures in each of the 24 industrial groups, corresponding to the orders of the Standard Industrial Classification, have been used; they have not been further broken down by individual industry. The limitations implied by this simplification are not believed to be serious. Furthermore, figures for men and women have been combined throughout the analysis. The unemployment rates have been worked out as percentages of unemployed to total insured employees—employed and unemployed.

Unemployment rates will be described as specific or overall figures, according to whether they refer to one industry group or the whole industrial field; similarly regional and national unemployment percentages will be distinguished. Thus, there are 264 specific regional, 24 specific national, and 11 overall regional unemployment percentages, apart from the overall national rate amounting to 1.27 per cent in 1948.

Table I shows two sets of overall regional unemployment percentages, the first one based on all unemployed, the second one on those classified by industry only. The second set of figures will be used throughout the future analysis.

TABLE I

Unemployment rates by region, all industries, 1948

Region	% of insured employees, based on	
	all unemployed	persons classified by industry only
London and South Eastern ...	.91	.85
Eastern	.76	.72
Southern	.97	.88
South Western	1.07	1.01
Midland	.61	.57
North Midland	.43	.40
East and West Ridings	.78	.74
North Western	1.80	1.68
Northern	2.44	2.26
Scotland	2.55	2.31
Wales	4.34	3.69
Great Britain	1.38	1.27

The differences between the two columns are not large, except in Wales, where a large number of ex-miners unfit for employment in coal mines are excluded by the second procedure.

The unemployment rates in the various regions, though small measured at pre-war standards, show substantial differences. The second column of the table shows 6 regions with fewer than 1 per cent unemployed, 2 regions with 1—2 per cent and 3 regions with over 2 per cent unemployed—in the case of Wales, unemployment exceeds 3 per cent.

On the other hand, the picture obtained from the specific national unemployment rates is as follows :

TABLE II

Unemployment rates by industry group, Great Britain, 1948

Industry Group	% of insured employees
Agriculture, Forestry, Fishing	.76
Mining and Quarrying	.29
Treatment of Non-Metalliferous Mining Products other than Coal ...	1.26
Chemicals and Allied Trades	1.66
Metal Manufacture	1.42
Engineering, Shipbuilding and Electrical Goods	1.73
Vehicles	1.18
Metal Goods not elsewhere specified	1.57
Precision Instruments, Jewellery, etc.	1.12
Textiles	.64
Leather, Leather Goods and Fur	1.73
Clothing	1.34
Food, Drink and Tobacco	1.25
Manufactures of Wood and Cork	1.64
Paper and Printing	.56
Other Manufacturing Industries	1.80
Building and Contracting	2.68
Gas, Electricity and Water Supply	.63
Transport and Communication	1.34
Distributive Trades	.96
Insurance, Banking and Finance	.53
Public Administration and Defence	1.48
Professional Services	.56
Miscellaneous Services	1.48
All industries	1.27

Table II shows that in 15 out of 24 industry groups, the unemployment rate is between 1 and 2 per cent; in 8 industry groups it is below 1 per cent, though the very low value for Mining and Quarrying is due to the method of counting in Coal Mining; and in 1 industry group only—Building and Contracting—unemployment is above 2 per cent. Thus, the differences between industries appear to be far less marked than the regional differences.

This view is confirmed when measures of dispersion for the overall regional and the specific national percentages are worked out, applying the number of insured employees in each region or industry as weights to the squares of the deviations from the average. For the 11 overall regional percentages, a variance of .647 and thus a standard deviation of .804 is obtained;

for the 24 specific national percentages, a variance of .314 and a standard deviation of .560. Thus, the dispersion between regions is greater than that between industries.

Nor is this the whole story. Some reflection shows that for the specific national rates, which are averages of only 11 specific regional rates, a higher dispersion might be expected than for the overall regional figures, which are averages of 24 specific regional rates. But it can be shown that both standard deviations are higher than expected, though much more so in the case of the overall regional than in the case of the specific national figures. As an approximation, neglecting the fact that averages and standard deviations are weighted, the following argument applies.

Consider the 264 specific regional unemployment rates as a population with an average of 1.27. The variance of the population is found to be 1.351 and hence the standard deviation to be 1.162. On the hypothesis that the 264 units are distributed at random, without significant differences between regions or industries, the standard deviation of the overall regional percentages should approximate the standard error of a random sample without replacement of 24 units, which would amount to :

$$1.162 \sqrt{\frac{240}{24 \times 263}} = 1.162\sqrt{\frac{10}{263}} = .227$$

Similarly, the standard deviation of the specific national percentages should approximate the standard error of a random sample without replacement of 11 units, amounting to :

$$1.162 \sqrt{\frac{253}{11 \times 263}} = 1.162\sqrt{\frac{23}{263}} = .344$$

The results may be summarised in the following table.

TABLE III

Standard deviation of unemployment percentages, 1948

	11 overall regional percentages	24 specific national percentages
Actual figure	.804	.560
Hypothetical figure	.227	.344
Ratio	3.5	1.6

The result can be interpreted as follows : there appears to be a systematic difference between the unemployment rates in different industries, as one might indeed expect; or more explicitly, some industries appear to have high, others low, unemployment rates in all or most regions. But the differences between regions for the same industry appear to be far more pronounced. The differences between industries may be partly due to occupational immobility but also partly to different rates of labour turnover, whilst the differences between regions mainly reflect geographical immobility. Thus, the figures clearly suggest that geographical immobility is relatively a good deal more important than occupational immobility.

Similar calculations have been made for the year 1939. For this purpose, the industry figures of total employed and unemployed have been re-arranged, as far as possible, on the basis of the Standard Industrial Classification, so as to obtain the same 24 industry groups. No allowance, however, has been made for changes in the scope of insurance, nor for changes in classification. Thus, the specific unemployment rates for 1939 are not strictly comparable with those for 1948, but the discrepancies should not markedly affect their dispersion. In Table IV, the overall national unemployment rate and the dispersion between overall regional and specific national rates for 1939 are shown and compared with the 1948 figures.

TABLE IV

Average and dispersion of unemployment rates 1939 and 1948.

	1939	1948
Overall national rates	7.55	1.27
Dispersion between overall regional rates:		
Standard deviation	3.153	.804
Coefficient of variation (%)	41.8	63.5
Dispersion between specific national rates:		
Standard deviation	3.045	.560
Coefficient of variation (%)	40.3	44.2

Average unemployment was, of course, much lower in 1948 than in 1939, though not to the extent which the figures of 7.55 and 1.27 would appear to show. The changes in scope of industrial employment covered by insurance explain part of the fall, which nevertheless remains real enough. For this reason, the coefficient of variation must be used to compare dispersion in 1939 and in 1948.

The table shows that the relative differences between industries are practically the same in 1948 as in 1939; to be quite accurate, there has been a slight increase. But the increase shown by the regional differences is very much more marked. Thus, although the regional differences in unemployment percentages have, of course, diminished, they have done so to a smaller extent than the national average; and thus the regional degree of inequality, though less serious in effect, is relatively more pronounced than before.

II

The question how far the level of unemployment in a region is determined by its industrial structure does not, of course, readily admit of an answer, if asked in the wider sense. But it can be narrowed down as follows : Assume that all specific regional unemployment rates are equal to the corresponding specific national rates; that is to say, assume that the unemployment rate varies from industry to industry, but not between regions for the same industry. Then for any given region, the hypothetical overall unemployment rate obtained on this basis depends only on the extent to which industries with high or low national unemployment rates are represented in the region; and the difference between this hypothetical rate and the national rate can be said to show the effect of the industrial structure of the region on its unemployment level.

On the basis of the 24 specific national unemployment rates in each industry group, the hypothetical unemployment percentages have been worked out for each region both for 1939 and for 1948, and in Table V they are compared with the actual percentages.

TABLE V

Actual unemployment rates in each region 1939 and 1948, and hypothetical rates on basis of national unemployment percentage in each industry

Region	1939		1948	
	Actual	Hypothetical	Actual	Hypothetical
London and South Eastern	4.92	7.12	.85	1.32
Eastern	4.79	7.02	.72	1.28
Southern	2.92	7.44	.88	1.34
South Western	4.02	7.51	1.01	1.28
Midland	5.30	7.02	.57	1.33
North Midland	6.36	7.81	.40	1.18
East and West Ridings	7.96	7.88	.74	1.18
North Western	10.91	7.61	1.68	1.25
Northern	12.34	8.34	2.26	1.22
Scotland	10.25	7.67	2.31	1.25
Wales	14.17	9.03	3.69	1.19
Great Britain	7.55	7.55	1.27	1.27

Consider first the results for 1939. It is clearly seen that actual unemployment shows far greater variations from region to region than hypothetical unemployment, and therefore far greater variations than those explained by differences in industrial structure. At the same time, actual and hypothetical unemployment seem to vary in the same direction, and the differences in industrial structure would thus seem to give a partial explanation for the regional differences in unemployment.

The correlation coefficient between actual and hypothetical unemployment in the 11 regions in 1939 works out at + .78, a value which would appear to be significant. Furthermore, the regression coefficient of actual on hypothetical unemployment has the value of + 5.0. Thus, the regional differences are 5 times larger than expected on the basis of national unemployment rates.

The interpretation of this result is not easy. A multiplier effect appears to operate in each region : where industries with high unemployment rates predominate, this seems further to depress employment in the region, and conversely a prevalence of industries with low unemployment has further favourable effects. But the value 5 cannot be assigned to this multiplier with any degree of confidence. Only a broad industrial classification has been used here, and a finer classification would imply other difficulties, owing to small numbers involved. Furthermore, the regional unemployment level may have been influenced by other factors, which cannot easily be assessed. Nevertheless, the high correlation between actual and hypothetical unemployment in 1939 remains a notable feature.

Quite a different result is obtained for 1948. The regional variations in hypothetical unemployment are not only slight, but they are also apparently unrelated to the variations in actual unemployment. In fact, the correlation coefficient is found to be negative and of doubtful significance; its value is —.35. Thus, unemployment seems to have changed its character. No longer does it, in any given region, appear to be associated with particular industries and their influence, but where it persists, it does so for other reasons.

The question regarding the influence of industrial structure on unemployment in a region may, however, be answered in a different way. Instead of the specific national unemployment percentages, the specific regional percentages may be taken as given; and the hypothesis of each region having the same industrial structure as Great Britain as a whole may be considered. The hypothetical unemployment figure thus obtained will eliminate the effect of the industrial distribution, and the difference between hypothetical and actual unemployment in each region will show the effect which perfect industrial diversification—in the sense of adopting the industrial pattern of Britain as a whole—would produce on the region, provided that unemployment rates in each industry in the region are not affected by such a process. This assumption is, of course, highly unrealistic, since the unemployment rate in an industry might be completely different at a different level of employment, even in the long run; nevertheless, it is legitimate to make it here for the sake of the argument.

The regional unemployment rates obtained by this approach have been worked out on the basis of 24 industry groups for 1948, and the results are incorporated in Table VI.

TABLE VI

Actual unemployment rates in each region 1948, and hypothetical rates based on a uniform industrial structure

Region	Actual	Hypothetical
London and South Eastern	.85	.84
Eastern	.72	.74
Southern	.88	.90
South Western	1.01	1.01
Midland	.57	.53
North Midland	.40	.45
East and West Ridings	.74	.86
North Western	1.68	1.74
Northern	2.26	2.47
Scotland	2.31	2.34
Wales	3.69	4.32
Great Britain	1.27	1.33

It will be noticed that the hypothesis made here is incompatible with assuming unemployment as a whole in Great Britain to remain unchanged. On the contrary, if the specific regional—not national—unemployment rates remain constant, more even distribution of industry would lead to an increase in unemployment in Britain as a whole and for all regions except the London and South Eastern, the South Western and the Midland region. This is because in the majority of regions it is the case that industries in which the region has a relatively large share tend to have lower unemployment rates than those in which it is deficient. If the position was that most regions specialised in industries which, in those regions, had higher unemployment rates than the under-represented industries, the opposite result would be obtained. But starting from the present structure of industry, industrial diversification, unless accompanied by a fall in specific regional unemployment rates, would raise rather than diminish overall unemployment.

III

A further point of interest may now be considered. The specific regional unemployment rates have been shown to be influenced by both a regional and an industrial factor. It may therefore be asked whether they can be described by a simple formula, based on a regional factor, independent of industry, and an industrial factor, independent of region. The formula suggested is :

$$U_{jk} = \frac{U_j \times I_k}{100} \quad (j=1, 2, \ldots 24; k=1, 2, \ldots 11)$$

Where U_{jk} is the unemployment rate in industry group j, region k.

U_j represents the ' normal unemployment rate ' in industry j.

I_k represents the ' unemployment index ' for region k.

Numerical values for the 24 constants U_j and the 11 constants I_k have been obtained as follows : On the hypothesis of perfect industrial diversification, work out the hypothetical specific national percentages, corresponding to the overall regional percentages given in the second column of Table VI. These figures will constitute the ' normal unemployment rates ' U_j; they will be similar to the actual percentages given in Table II, but unaffected by the location of the industry. The constants I_k are so chosen as to give the actual total unemployment in each region. For example, at ' normal ' unemployment percentages, London and the South East would have 69,570 unemployed; actually the region has 43,320 or 62.3 per cent of the former figure; hence the unemployment index is 62.3.

Thus, the assumption underlying the formula is that unemployment in each region tends to be distributed in such a way over the various industry groups that all specific unemployment rates are proportionate to the corresponding normal rates, and thus to the specific rates in another region.

The values of the constants in the formula, thus obtained, are shown in Tables VII and VIII. The third decimal in U_j is given for the purpose of further calculations.

TABLE VII

Normal unemployment rate for each industry group, 1948

k : Industry group	U_j (%)
I : Agriculture, Forestry, Fishing	.833
II : Mining and Quarrying	.325
III : Treatment of Non-Metalliferous Mining Products other than Coal	1.473
IV : Chemicals and Allied Trades	1.549
V : Metal Manufacture	1.250
VI : Engineering, Shipbuilding and Electrical Goods	1.824
VII : Vehicles	1.336
VIII : Metal Goods not elsewhere specified	2.031
IX : Precision Instruments, Jewellery, etc.	1.654
X : Textiles	.873
XI : Leather, Leather Goods and Fur	1.809
XII : Clothing	1.503
XIII : Food, Drink and Tobacco	1.253
XIV : Manufactures of Wood and Cork	1.672
XV : Paper and Printing	.618
XVI : Other Manufacturing Industries	2.175
XVII : Building and Contracting	2.663
XVIII : Gas, Electricity and Water Supply	.686
XIX : Transport and Communication	1.277
XX : Distributive Trades	.953
XXI : Insurance, Banking and Finance	.693
XXII : Public Administration and Defence	1.546
XXIII : Professional Services	.562
XXIV : Miscellaneous Services	1.516

TABLE VIII

Unemployment index for each region, 1948

k : Region	I_k
1 : London and South Eastern	62.3
2 : Eastern	54.1
3 : Southern	64.0
4 : South Western	76.2
5 : Midland	40.2
6 : North Midland	32.3
7 : East and West Ridings	58.8
8 : North Western	126.7
9 : Northern	179.4
10 : Scotland	177.2
11 : Wales	303.2

Thus, for example, the calculated value of unemployment in 'Agriculture, Forestry and Fishing' in the London and South Eastern Region is $\frac{.833 \times 62.3}{100} = .52$ per cent whilst the actual figure is .45 per cent; and so on.

In order to test the fit of the formula to the actual figures, the variance of the deviations of the 264 specific regional unemployment rates from their calculated values has been worked out. This variance is found to amount to .150. Since the 264 unemployment rates themselves have a variance of 1.351, the formula explains 89 per cent of the total variance and leaves 11 per cent unexplained. The fit can therefore be considered as satisfactory.

Thus, the assumptions underlying the use of the formula and the method by which the constants are obtained, appear to be fairly realistic. The implications are that geographical mobility of labour is low but occupational mobility high. Owing to differences in labour turnover and other factors, unemployment rates in different industries do not tend to become equal. But unemployment in any one region, which at a given date can be considered as a given quantity, tends to distribute itself over the different industry groups in such a way that unemployment rates in any two industry groups are approximately in the same relation to each other in every region. This phenomenon points to movements of labour from industry to industry; but in the absence of movements from region to region, geographical differences in the general level of unemployment remain relatively large.

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